

# Teaching and Training Surgery to the Next Generation of Surgeons

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## INTRODUCTION

Training surgical residents to become the next generation of surgeons involves very significant challenges not faced by educators of a generation ago. Never before have educators had to face the unique challenges involved in surgical education that are now becoming more clearly defined. This discussion will focus on inguinal hernia repair as an index operation to illustrate the challenge faced by surgical educators in the early 21st century.

In broad measure, the challenges facing surgical education can be divided into 3 main categories.

1. Residency training
2. Mentor availability
3. Teaching operative procedures

## Residency Training

The first area of concern involves residency training. There has been much rhetoric expended regarding the limitation of resident duty hours, but precious little science. Resident work hours have been limited to 80 hours per week in the United States (US) and will likely continue to be curtailed. The current US standards call for residents to be limited to an 80-hour work week averaged over 4 weeks; no more than 24 hours of continuous duty (6 additional hours allowed for continuity of patient care and educational activities), one day (24 hours) in 7 free of clinical responsibilities averaged over 4 weeks; 10 hours free between all daily duty periods and after in-house call; in-house call no more frequently than every third night averaged over 4 weeks.<sup>1</sup>

The drive for reduced resident working hours has revolved around:

1. Concern for patient safety
2. Concern for resident safety

## 3. Reduction of medical errors

Concern for patient safety in the US was highlighted by the 1986 Libby Zion case. Briefly, Ms. Zion (1966-1984) was an 18-year-old female taken to the emergency department of the New York Hospital because of agitation and fever. She had been on phenelzine for depression. During the course of her 8-hour hospital admission, she was given meperidine, which is thought to have resulted in a serotonin syndrome response. She became hyperpyrexia (107.6°F) and suffered a fatal cardiac arrest within 8 hours of admission.<sup>2</sup> Two house staff members were involved with Ms. Zion's care. It was alleged that the intern and resident had been on duty for an extended period, and resident fatigue along with poorly directed management was a major factor in Ms. Zion's demise.

The Libby Zion case drew national attention to resident fatigue, although lack of resident supervision may have been a more important factor in the care provided Ms. Zion and events leading to her death. As a result of widespread public debate that was spearheaded by her father, *New York Times* columnist Sidney Zion (1933-2009), the Bell Commission was appointed to study the issues raised by this case. In 1989, the New York legislature stipulated in the New York State Department Health Code, Section 405, that resident physicians' work week be limited to 80 hours per week. This regulation became known as the Libby Zion law, which was a major factor in instigating the medical errors movement of the 1990s. In July 2003, the Accreditation Council for Graduate Medical Education (ACGME) adopted similar resident work-hour regulations for all accredited medical training institutions in the US.

European standards for resident work hours are even more restrictive than those in the US. In Belgium, the "Colla law" mandates that a resident workweek be limited to 48 hours with no more than 24 hours on call uninterrupted; and only one weekend day on call within 3 weeks. National insurance does not cover trainees if they work over the limit. Another factor demanding attention of educators is the changing demographics of medical students in Europe. The number of female medical students in Belgium is growing and now approximates 70%.<sup>3</sup> Further complicating matters is that the number of medical students and physicians entering specialty-training programs is capped by regional and federal government agencies in Belgium. And, because a change in ministers often means a change in regulations, medical students are frequently uncertain

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DOI: 10.4293/108680811X13125733356675

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as to the direction they can pursue in determining their careers. The consequence of these facts and other issues is that the ranks of surgical trainees in Belgium are decreasing.

Even more disturbing than the situation in Belgium are findings resulting from a Web-based survey conducted with the European Association of Cardio-Thoracic Surgery.<sup>4</sup> The survey was mailed to 413 European Association for Cardio-Thoracic Surgery members; 116 members replied (28%) of which 79 (68%) were complete. This study, which contacted 55 training centers in Europe, had a relatively low response rate; however, the conclusions drawn from the survey were surprising, and, in some aspects, astonishing.

Key points iterated in the study conclusions included the following:

- The European Working Time Directive (EWTD) has not been applied across Europe.
- Most European trainees are dissatisfied with their training.
- Under current conditions, most trainees believe the 48-hour workweek is insufficient to achieve an adequate level of surgical competence.
- Most European surgeons do not go through a structured and organized training program during their training.
- Most European surgeons can achieve certification without being independently evaluated during the residency or without an exit exam.
- Most European surgeons get trained by unqualified trainers in centers not independently and regularly assessed for training capability.
- There are significant disparities in the quality of cardio-thoracic training among member states of the European Union.<sup>4</sup>

It is obvious that reducing resident work hours has contributed to increased time available for rest and relaxation. It is not always obvious, however, that the time made available to residents is used for these purposes. Furthermore, it is obvious that there is concern among many residents and faculty that reduced time in the institution and in the operating room has had a negative impact on resident learning and training. Add to this an historical attrition rate of 17% to 26% for US categorical general surgery residents along with the more recent exodus of chief surgical residents from general surgery to post residency fellowship training, and the problem of a diminished pool of general surgeons is further compounded.<sup>5,6</sup>

### **Mentor Availability**

There were 17 394 US general surgeons in 1981 (7.68/100 000 population), and 16 662 general surgeons in 2005

(5.69 per 100 000 population). In absolute numbers, this represents a 4.2% decline in general surgeons during a 25-year period. However, the US population increased from 226 to 292 million during this same time period. The concomitant increase in population translates to a 25.9% relative decrease of general surgeons per 100 000 population during 1981-2005.<sup>7</sup> In short, there is an absolute decrement in the number of general surgeons available nationwide to help train surgical residents. Currently, there are approximately 63% of US general surgeons in private practice, and their incomes are largely based on productivity.<sup>8</sup> Private practice surgeons have less time to devote to surgical education.

Personal experience as a General Surgery Program Director in a Midwest Level 1 trauma center along with the findings of others has prompted the following observations:

- Less complex surgical procedures are commonly performed outside of the teaching center.
- There has been a change to outpatient centers and ambulatory surgical clinics for less complex surgical procedures.
- Surgical teaching faculty members have experienced a reduction in “bread and butter” general surgical operative cases.
- Teaching faculty are largely dependent on the indigent clinic for their main source of referrals.
- Nonindigent patients prefer local outpatient facilities and ambulatory surgical care centers for nonurgent general surgical procedures.<sup>9</sup>
- Paid teaching faculty members on fixed stipends have little incentive to increase their clinical practice.
- An inexorable decline in surgical reimbursement has fostered a “production line” mentality for private sector practitioners. The demands of productivity-based reimbursement have resulted in a marked decline in the time and inclination of private practice surgeons to mentor surgical residents.
- There is a seemingly inexorable decline in reimbursement for operative procedures.<sup>9,10</sup>

### **Operative Procedures**

Teaching hernia repair or any other operative procedure to the next generation of surgeons is complicated by the plethora of operative procedures, techniques, and materials available for surgical intervention. In many instances, the “best” surgical procedure is more appropriately defined by the circumstances in which it is performed.

For example, a pure tissue repair of groin hernia using only suture and local, regional, or general anesthesia can be performed with minimal cost. The Bassini procedure and its clone, the Shouldice repair, are effective operations for groin hernia

with a low complication and recurrence rate. Pure tissue herniorrhaphy may be the “best” operation for those patients in economically distressed areas and third-world countries. However, pure tissue repair requires a surgeon knowledgeable in anatomy and skilled in suture technique and tissue handling.

Open inguinal hernioplasty with synthetic mesh may be the “best” procedure when simplicity of technique and effective reproducible results are significant considerations. Note, however, the cost of mesh materials may be prohibitive in underdeveloped countries. Moreover, the opportunity to teach and learn surgical anatomy is more limited than during pure tissue repair.

Finally, laparoscopic access to groin hernia recommends itself when there are bilateral or multiple hernias, after open repair with the presence of scarred tissue planes, or when a rapid return to normal activity is important. A disadvantage is that general anesthesia trained staff and a well-equipped operating room are required.

## CONCLUSION

Teaching and training surgical procedures to the next generation of surgeons will require an entirely different mindset for surgical educators. A solution to the conundrum of reduced resident work hours and provision of an adequate educational experience to assure competence is not simple and may require multiple approaches.

Compounding the complexity of work-hour restrictions is the increasing role women are playing in medicine and, in particular, surgery. The demands of child rearing and family time are real and important considerations for female surgical residents. Flexible rotations and scheduling help alleviate the strain of surgical training, but more needs to be done to address these issues.

Increasing the length of resident training time, while not palatable, may be necessary to compensate for the reduction in hours spent in the institution each week. Additionally, social networking tools using iPads and iPhones may be very beneficial in leveraging surgical education opportunities.

Importantly, a way must be found to provide incentives for private practitioners to mentor surgical residents. No longer can reliance on altruism alone guarantee an adequate reservoir of motivated mentors. They must be compensated, in part, with appropriate honors, professional recognition, and also monetary emolument for their time spent teaching.

Involvement of local community hospitals, outpatient centers and ambulatory surgical clinics with tertiary teaching

institutions need to be more robust. Resident access to common surgical disease must be of sufficient volume and quality to provide a meaningful educational experience. More formal alliances with these entities will help break down barriers for joint endeavors.

Teaching faculty should have financial incentives and time to increase their clinical practice. A vigorous teaching faculty strongly allied with the institution will help guarantee a vibrant environment for resident education and research.

General surgical residents must be shown that the practice of general surgery is as rewarding as that of any surgical subspecialty. To that end, dialogue with payers and governmental agencies charged with overseeing medical care must be initiated to militate against the corrosive effect of declining reimbursement in the face of increasing demand.

## References:

1. Accreditation Council for Graduate Medical Education. Available at: [www.acgme.org](http://www.acgme.org). Accessed February 4, 2011.
2. Libby Zion's Lesson: Adverse Drug Reactions and Interactions. Laurence Kinsella. Posted online July 2, 2009. American Academy of Neurology. Accessed February 4, 2011.
3. Defechereux T. European experience no model for US experience. *The Journal of Family Practice*. JFP 2010. Accessed January 27, 2011.
4. Sabada JR, Loubani M, Salzberg SP, et al. Real life cardiothoracic surgery training in Europe: facing the facts. *Card Vasc Thorac Surg*. 2010;11:243–246.
5. Yeo H, Viola K, Berg D, et al. Attitudes, training experiences and professional expectations of US general surgery residents. *JAMA*. 2009;302(12):1301–1308.
6. Sitzenberg KB, Sheldon GF. Progressive specialization within general surgery: adding to the complexity of workforce planning. *J Am Coll Surg*. 2005;201(6):925–932.
7. Lynge DC, Larson EH, Thompson MJ, Rosenblatt RA, Hart LG. A longitudinal analysis of the general surgery workforce in the United States 1981–2005. *Arch Surg*. 2008;143(4):345–350.
8. Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American Surgeons. *Ann Surg*. 2009; 250:463–471.
9. Kozak LJ, McCarthy E, Pokras R. Changing patterns of surgical care in the United States, 1980–1995. *Health Care Financing Review*. 1999;21(1):31–50.
10. Hoballah JJ, Liao J, Salameh M, Weigel RJ. Physician reimbursement for general surgery procedures in the last century. *J Am Coll Surg*. 2008;206(4):670–677.